**Amendments to the Claims:**

Claims 1-4. (canceled)

Claim 5. (currently amended) A high impedance structure, comprising:

at least two layers, each said layer presenting a high impedance to the E field component of a different respective signal frequency, each said layer also being transparent to the E fields of lower frequency signals, and presenting a conductive surface to the E field of higher frequency signals; and

the bottommost said layer presenting a high impedance to the E field of the lowest frequency of said signals, and each succeeding layer presenting a high impedance to the E field of successively higher frequencies, wherein each said layer comprises a substrate of dielectric material having a top and bottom surface and a plurality of radiating elements on said substrate's top surface, and further comprising a conductive layer on the bottom surface of the bottommost layer's dielectric substrate, and ~~The structure of claim 3,~~ wherein said radiating elements comprise conductive patches.

Claims 6 and 7. (canceled)

Claim 8. (original) The structure of claim 5, wherein the widths of said strips decreases and the width of said gaps increases with succeeding said layers from the bottommost said layer to the topmost.

Claim 9. (original) The structure of claim 5, wherein corresponding conductive patches of said layer are vertically aligned, further comprising conductive vias through said

substrates between said aligned conductive patches and said conductive layer.

Claim 10. (original) The structure of claim 5, wherein said conductive patches on each said layer are equally spaced and have uniform gaps between adjacent said patches.

Claim 11. (original) The structure of claim 5, wherein the size of said patches decreases and the width of said gaps between adjacent patches increases with succeeding said layers from the bottommost layer to the topmost.

Claims 12 and 13. (canceled)

Claim 14. (original) A rectangular waveguide for transmitting electro-magnetic signals, comprising:

a rectangular waveguide having four walls comprising two opposing sidewalls and a top and bottom wall; and

a high impedance wall structure having at least two layers, at least said sidewalls or said top and bottom walls having said layered wall structure, each layer of said structure presenting a high impedance to the E field of a different signal frequency.

Claim 15. (original) The waveguide of claim 14, further comprising an electromagnetic signal source at one end of said waveguide arranged to direct electromagnetic signals into said waveguide with an E field transverse to the waveguide axis and parallel to said wall structure.

Claim 16. (original) The waveguide of claim 14, further comprising an amplifier mounted at the opposite end of the waveguide to amplify signals transmitted through the waveguide

from said signal source.

Claim 17. (original) The waveguide of claim 14, wherein said amplifier is an amplifier array.

Claim 18. (original) The waveguide of claim 14, for a signal having a horizontal polarization, said high impedance wall structure provided on sidewalls of said waveguide.

Claim 19. (original) The waveguide of claim 14, for a signal having a vertical polarization, said high impedance wall structure provided on sidewalls of said waveguide.

Claim 20. (original) The waveguide of claim 14, for a signal having vertical and horizontal polarizations, said wall structure provided on all four walls of said waveguide.

Claim 21. (original) The waveguide of claim 14, wherein each said layer of said structure comprises a substrate of dielectric material having a top and bottom surface and a plurality of radiating elements on said substrate's top surface, and further comprising a conductive layer on the bottom surface of the bottommost layer's dielectric substrate.

Claim 22. (original) The waveguide of claim 21, wherein said radiating elements comprise parallel conductive strips longitudinally oriented down said waveguide.

Claim 23. (original) The waveguide of claim 22, wherein corresponding conductive strips of said layers are vertically aligned. further comprising conductive vias through said dielectric substrates between said aligned conductive strips and

said conductive layer.

Claim 24. (original) The waveguide of claim 22, wherein said conductive strips on each said layer have uniform widths and uniform gaps between adjacent strips.

Claim 25. (original) The waveguide of claim 22, wherein the widths of said strips decreases and the width of said gaps increases with succeeding said layers from the bottommost said layer to the topmost.

Claim 26. (original) The waveguide of claim 14, each said layer forms a series of resonant L-C circuits to electromagnetic wave at a respective frequency with an E field transverse to said conductive strips.

Claim 27. (original) A multiple frequency electro-magnetic signal amplifier, comprising:

a waveguide input section having a rectangular cross section and four walls, further having a layered high impedance wall structure on two opposing walls;

a waveguide amplifier section having a rectangular cross section and four walls, further having an amplifier array mounted midway through said amplifier section and a layered high impedance wall structure on said four walls; and

a waveguide output section having a rectangular cross-section and four walls, further having a layered high impedance wall structure on two opposing wall, wherein each said layer of said wall structure in each said section has two or more layers, each said layer presenting as high impedance to respective frequency E field that at least partially transverse to the waveguide axis and parallel to said wall structure, and a low

impedance parallel to the waveguide axis.

Claim 28. (original) The amplifier of claim 27, wherein said four walls of said input section comprise two sidewalls and a top and bottom wall, said layered high impedance wall structure mounted on said sidewalls.

Claim 29. (original) The amplifier of claim 27, wherein said four walls of said output section comprise two sidewalls and a top and bottom wall, said layered high impedance wall structure on said top and bottom walls.

Claim 30. (original) The amplifier of claim 27, wherein said amplifier section further comprises two matching polarizers, one matching polarizer mounted on each side of said amplifier array, said layered high impedance wall structure on said sidewalls and said top and bottom walls.

Claim 31. (original) The amplifier of claim 27, wherein each said layer of said wall structure comprises a substrate of dielectric material having a top and bottom surface and a plurality of radiating elements on said substrate's top surface, and further comprising a conductive layer on the bottom surface of the bottommost layer's dielectric substrate.

Claim 32. (original) The amplifier of claim 31, wherein said radiating elements comprise parallel conductive strips longitudinally oriented down said waveguide.

Claim 33. (original) The amplifier of claim 32, wherein corresponding conductive strips of said layers are vertically aligned, further comprising conductive vias through said

dielectric substrates, between said aligned conductive strips and said conductive layer.

Claim 34. (original) The amplifier of claim 32, wherein said conductive strips on each said layer have uniform widths and uniform gaps between adjacent strips.

Claim 35. (original) The amplifier of claim 32, wherein the widths of said strips decreases and the width of said gaps increases with succeeding said layers from the bottommost said layer to the topmost.

Claim 36. (original) The amplifier of claim 27, each said layer forms a series of resonant L-C circuits to electromagnetic wave at a respective frequency with an E field transverse to said conductive strips.

Claim 37. (original) A microstrip antenna for transmitting multi frequency electro-magnetic signals, comprising:

a microstrip resonator; and

a high impedance surface structure having at least two layers, wherein each said layer presenting as a high impedance to a different frequency E field, said microstrip line resonator etched on said layered high impedance surface.

Claim 38. (original) The antenna of claim 37, wherein each said layer of said layer comprises a substrate of dielectric material having a top and bottom surface and a plurality of radiating elements on said substrate's top surface, and further comprising a conductive layer on the bottom surface of the bottommost layer's dielectric substrate.

Claim 39. (original) The antenna of claim 38, wherein said radiating elements comprise conductive patches.

Claim 40. (original) The antenna of claim 39, wherein corresponding conductive patches of said layers are vertically aligned, further comprising conductive vias through said dielectric substrates, between said aligned conductive strips and said conductive layer.

Claim 41. (original) The antenna of claim 39, wherein said conductive patches on each said layer have uniform gaps between adjacent patches.

Claim 42. (original) The antenna of claim 39, wherein the size of said patches decreases and the width of said gaps increases with succeeding said layers from the bottommost said layer to the topmost.

Claim 43. (original) The antenna of claim 37, each said layer forms a series of resonant L-C circuits to electromagnetic wave at a respective frequency with an E field transverse to said conductive strips.

Claim 44. (original) The antenna of claim 40, wherein the substrate thicknesses from the top to the bottom layer are progressively thicker.

Claim 45. (original) The antenna of claim 44, wherein said radiating elements are substantially the same size at all said layers.